

Contribution ID: 70

Type: Paper

A Numerical Investigation of the Effect of Spatial and Temporal Resolution together with Turbulence Modelling on the Hydrodynamic Forces of a Cavitating Foil

Friday, 17 June 2022 09:40 (20 minutes)

Cavitation is a highly destructive phenomenon that significantly disrupts the performance of propellers and control surfaces in the maritime industry. Hence, the prediction of forces developed during cavitation, through various numerical techniques, is imperative for the design and operation of maritime vessels.

Since RANS turbulence models have proven to be the most computationally viable option for the fast-paced industry, this work analyses and compares several of these well-established models, including the SST and k-epsilon models modified to account for compressibility effects.

This paper aims to provide insight into the influence of timestep, mesh resolution and turbulence model on the hydrodynamic forces acting on a 2D cavitating hydrofoil, so as to facilitate future simulations.

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Session Classification: 5B

Track Classification: Numerical hydrodynamics